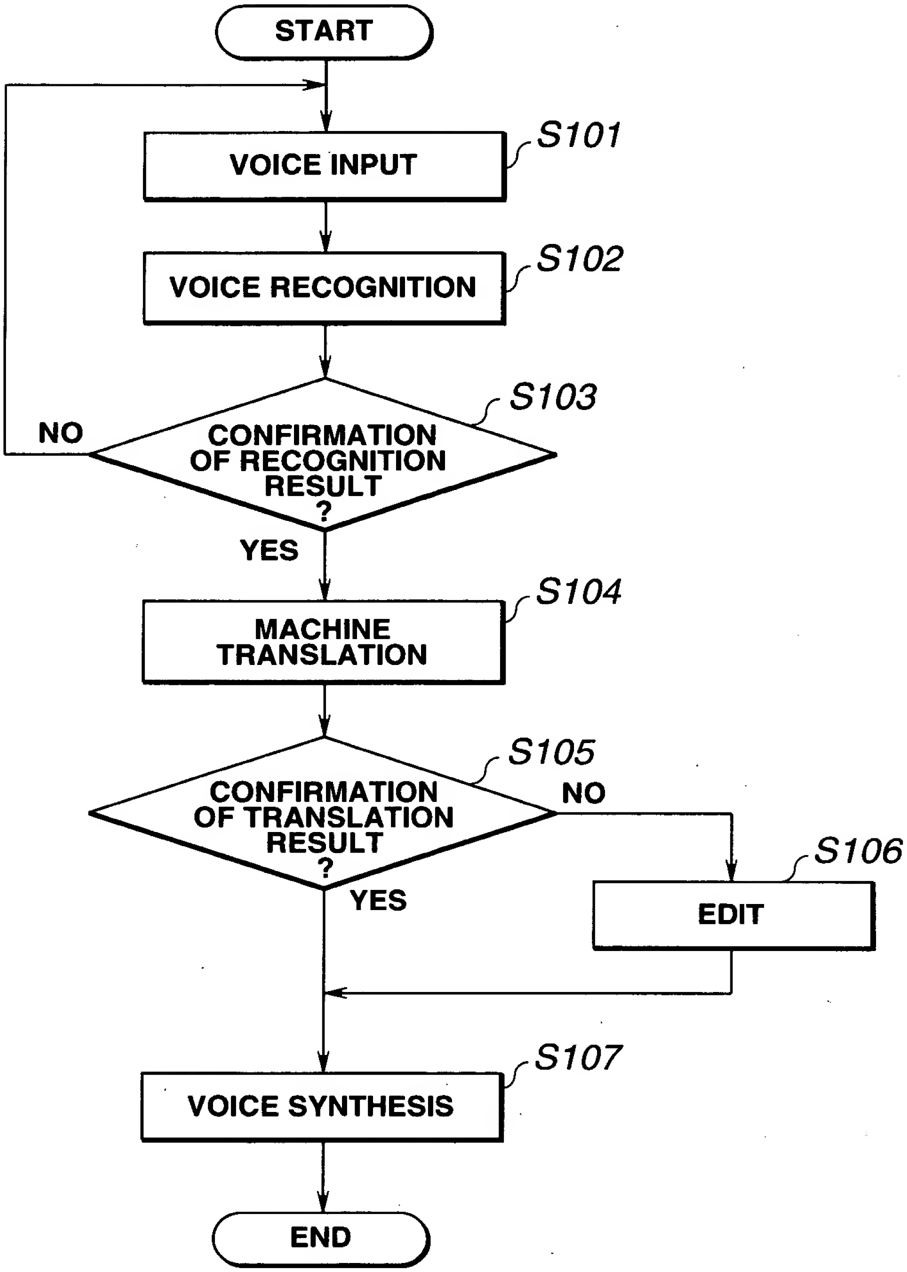
START
VOICE INPUT
S101
VOICE RECOGNITION
S102
CONFIRMATION OF RECOGNITION RESULT ?
S103
NO
YES
MACHINE TRANSLATION
S104
CONFIRMATION OF TRANSLATION RESULT ?
S105
NO
YES
EDIT
S106
VOICE SYNTHESIS
S107
END

FIG.1

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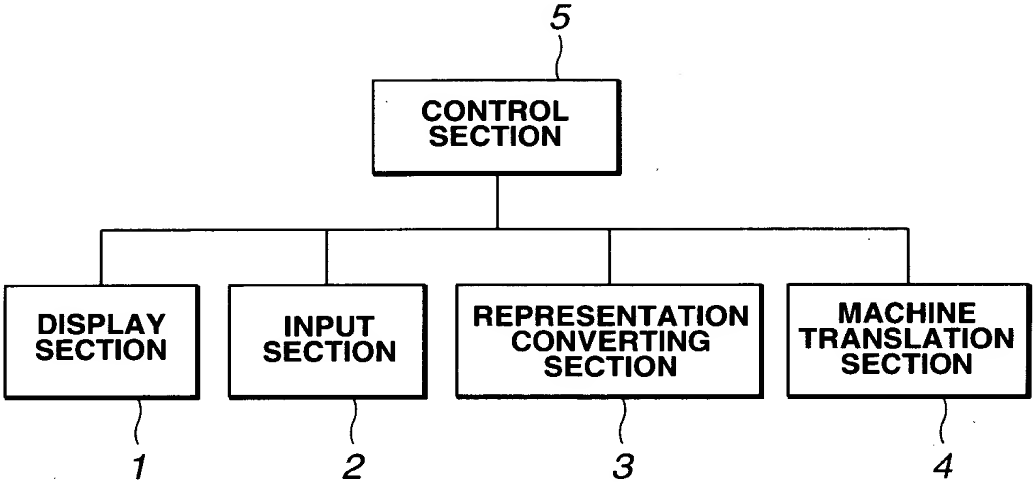
5
CONTROL SECTION
DISPLAY SECTION
INPUT SECTION
REPRESENTATION CONVERTING SECTION
MACHINE TRANSLATION SECTION
1
2
3
4

FIG.2

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1. (JAPANESE) X[MATERIAL] O KUDASAI
(ENGLISH) X PLEASE.

2. (JAPANESE) WATASHI WA X[PLACE] NI IKITAI
(ENGLISH) I WANT TO GO TO X.

3. (JAPANESE) X[MATERIAL] O Y[PERSON] NI MISETE KUDASAI
(ENGLISH) WOULD YOU SHOW Y X ?

4. (JAPANESE) S1[SENTENCE] SHIKASHI S2[SENTENCE]
(ENGLISH) S1, BUT S2.

5. (JAPANESE) S1[SENTENCE] SOSHITE S2[SENTENCE]
ENGLISH) S1, AND S2.

6. (JAPANESE) S1[SENTENCE] DAKARA S2[SENTENCE]
(ENGLISH) S1, SO S2.

7. (JAPANESE) SUIMASEN (=ARIGATO)
(ENGLISH) THANK YOU.

8. (JAPANESE) SUIMASEN (=AYAMARU)
(ENGLISH) I'M SORRY.

9. (JAPANESE) SUIMASEN (=YOBIKAKE)
(ENGLISH) EXCUSE ME.

10. (JAPANESE) X[PERSON] GA Y[VEHICLE] O TSUKAU
(=X GA Y NI NORU)
(ENGLISH) X GO BY Y.

11. (JAPANESE) X[PERSON] GA Y O TSUKAU
(=X GA Y O SYOHI SURU)
(ENGLISH) X CONSUME Y.

FIG.3

JAPANESE	ENGLISH	ATTRIBUTE
WATASHI	I	PERSON
RINGO	APPLE	MATERIAL
LONDON	LONDON	PLACE
BAGGU	BAG	MATERIAL

FIG.4

09530200.051500

BEFORE CONVERSION	AFTER CONVERSION
(CONVERSION RULE FOR SENTENCE END)	
~SHITE MORAE MASENKA	~SHITE KUDASAI
~TE ITADAKENAIDESHOKA	~SHITE KUDASAI
~TAI NO DESU	~SHITAI
~TAI NO DESUGA	~SHITAI
(RULE FOR DISSOLVING COMPOUND SENTENCE)	
~GA [CONJUNCTION POSTPOSITIONAL WORD] ~	~。 SHIKASI、 ~
~GA [CONJUNCTION POSTPOSITIONAL WORD] ~	~。 SOSHITE、 ~
~GA [CONJUNCTION POSTPOSITIONAL WORD] ~	~。 DAKARA、 ~
~ TE ~	~。 DAKARA、 ~
~ TE ~	~。 SOSHITE、 ~
~ TE ~	~。 SHIKASI、 ~
(RULE FOR POLYSEMOUS EXPRESSION)	
SUIMASEN	SUIMASEN (=ARIGATOU)
SUIMASEN	SUIMASEN (=AYAMARU)
SUIMASEN	SUIMASEN (=YOBIKAKE)
X O TSUKAU	X O TSUKAU (=X NI NORU)
X O TSUKAU	X O TSUKAU (=X O SHOHISURU)
(SHORTAGE ELEMENT SUPPLEMENT RULE)	
MISETE KUDASAI	(KOREO) MISETE KUDASAI
MISETE KUDASAI	(SOREO) MISETE KUDASAI
MISETE KUDASAI	(AREO) MISETE KUDASAI
X O MISETE KUDASAI	X O (WATASHI NI) MISETE KUDASAI
(ORDER EXCHANGE RULE)	
Y O X GA	X GA Y O
Y NI X GA	X GA Y NI
X GA Z O Y NI	X GA Y NI Z O
Y NI X GA Z O	X GA Y NI Z O
Y NI Z O X GA	X GA Y NI Z O
Z O X GA Y NI	X GA Y NI Z O
Z O Y NI X GA	X GA Y NI Z O

FIG.5

09530200 .051500

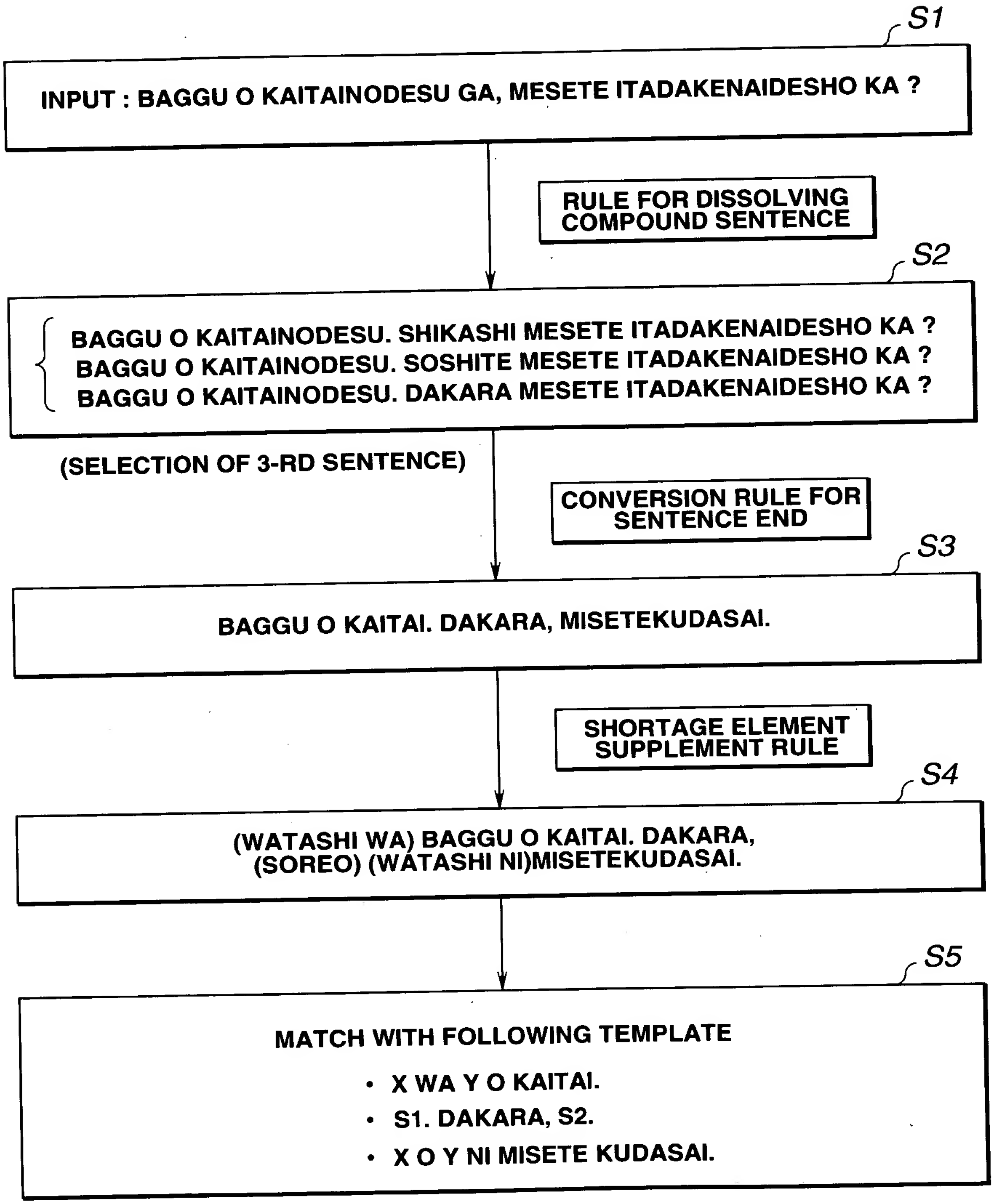
S1
INPUT : BAGGU O KAITAINODESU GA, MESETE ITADAKENAIDESHO KA ?
RULE FOR DISSOLVING COMPOUND SENTENCE
S2
BAGGU O KAITAINODESU. SHIKASHI MESETE ITADAKENAIDESHO KA ?
BAGGU O KAITAINODESU. SOSHITE MESETE ITADAKENAIDESHO KA ?
BAGGU O KAITAINODESU. DAKARA MESETE ITADAKENAIDESHO KA ?
(SELECTION OF 3-RD SENTENCE)
CONVERSION RULE FOR SENTENCE END
S3
BAGGU O KAITAI. DAKARA, MISETEKUDASAI.
SHORTAGE ELEMENT SUPPLEMENT RULE
S4
(WATASHI WA) BAGGU O KAITAI. DAKARA, (SOREO) (WATASHI NI)MISETEKUDASAI.
S5
MATCH WITH FOLLOWING TEMPLATE
• X WA Y O KAITAI.
• S1. DAKARA, S2.
• X O Y NI MISETE KUDASAI.

FIG.6

09530200.051500

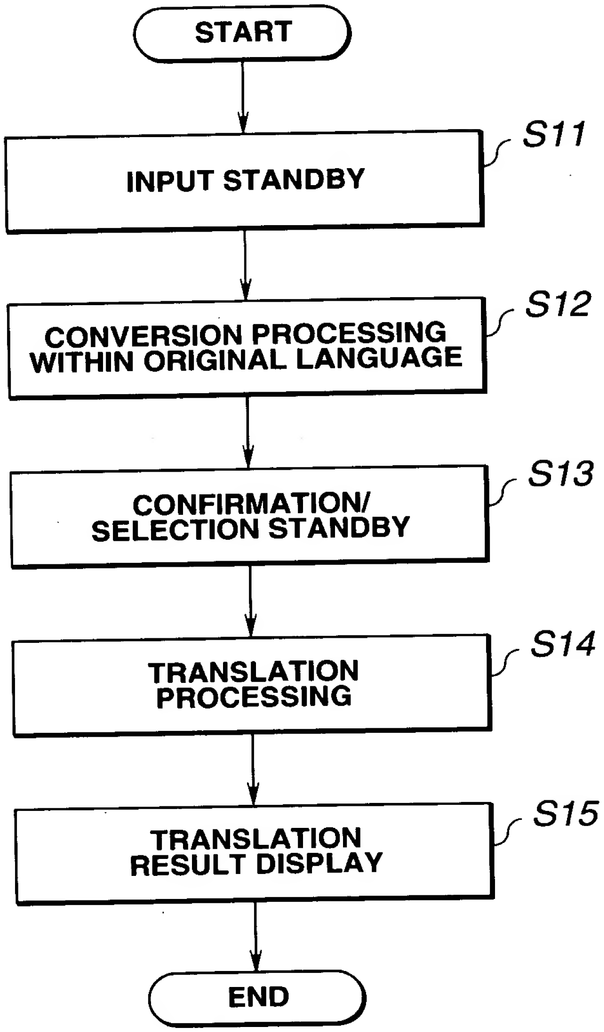
START
INPUT STANDBY
S11
CONVERSION PROCESSING WITHIN ORIGINAL LANGUAGE
S12
CONFIRMATION/ SELECTION STANDBY
S13
TRANSLATION PROCESSING
S14
TRANSLATION RESULT DISPLAY
S15
END

FIG.7

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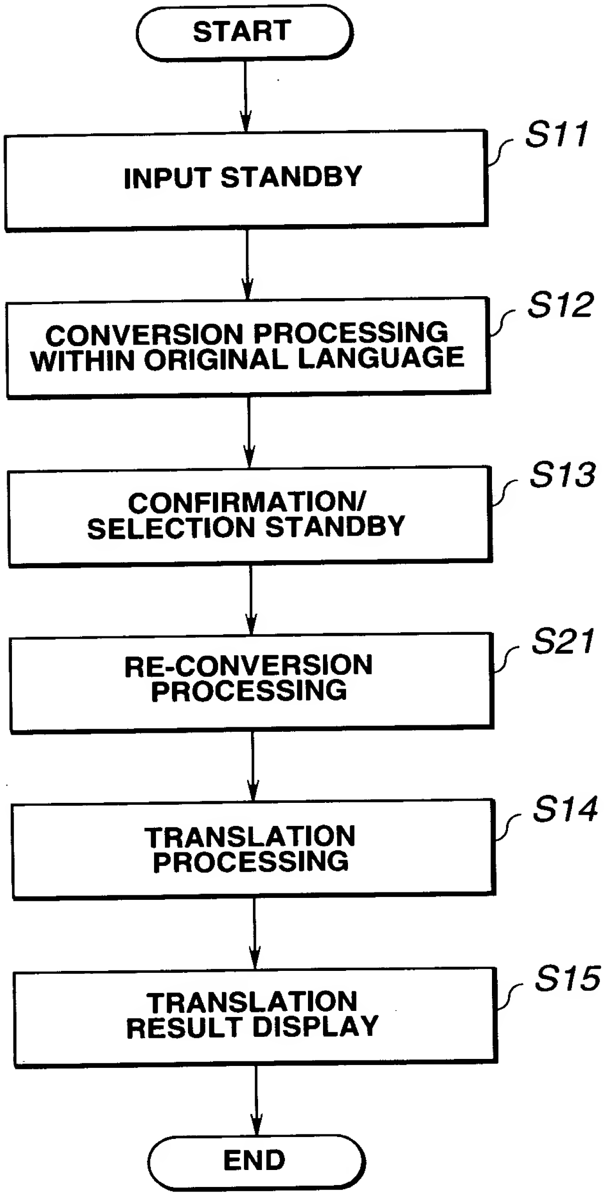
START
INPUT STANDBY
S11
CONVERSION PROCESSING WITHIN ORIGINAL LANGUAGE
S12
CONFIRMATION/ SELECTION STANDBY
S13
RE-CONVERSION PROCESSING
S21
TRANSLATION PROCESSING
S14
TRANSLATION RESULT DISPLAY
S15
END

FIG.8

09530200.051500

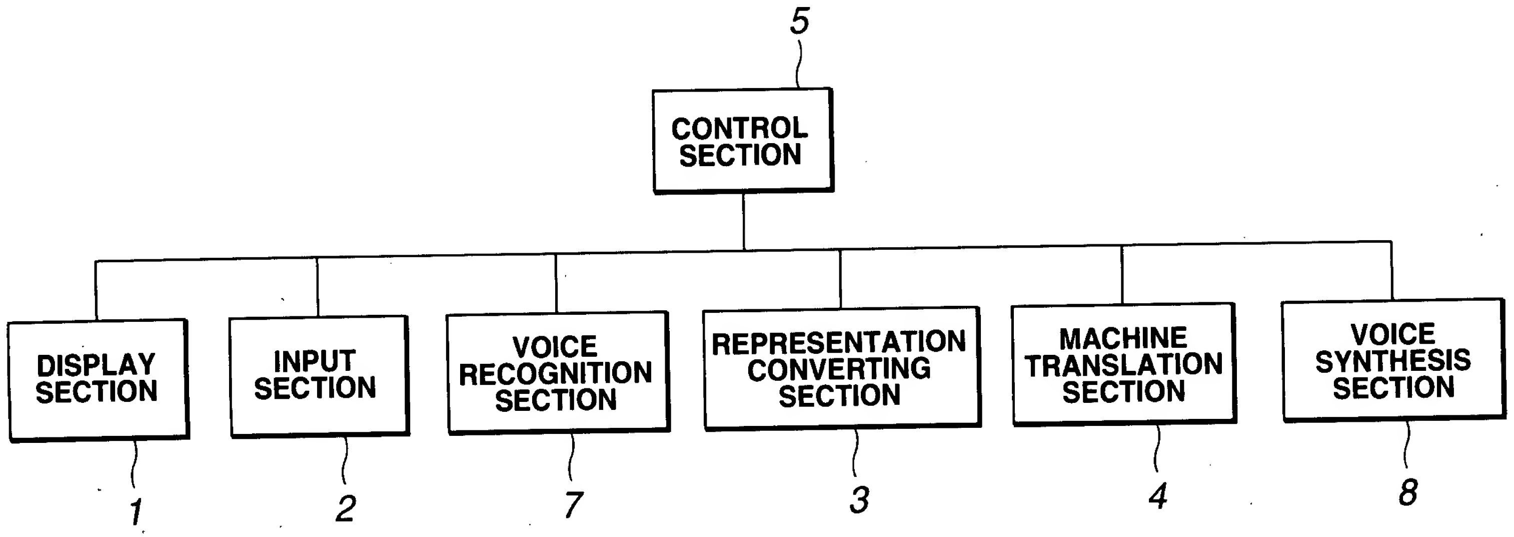
5
CONTROL SECTION
DISPLAY SECTION
1
INPUT SECTION
2
VOICE RECOGNITION SECTION
7
REPRESENTATION CONVERTING SECTION
3
MACHINE TRANSLATION SECTION
4
VOICE SYNTHESIS SECTION
8

FIG.9

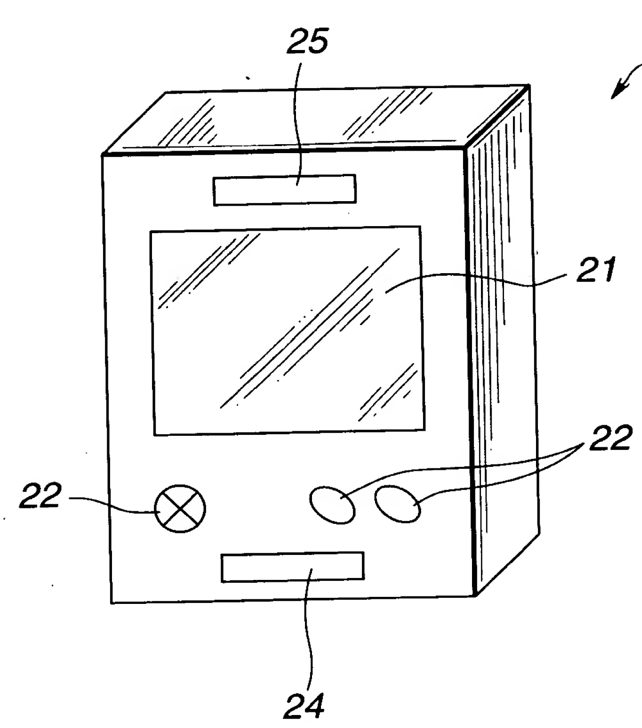
20
25
21
22
22
24

FIG.10

09530200 . 051500

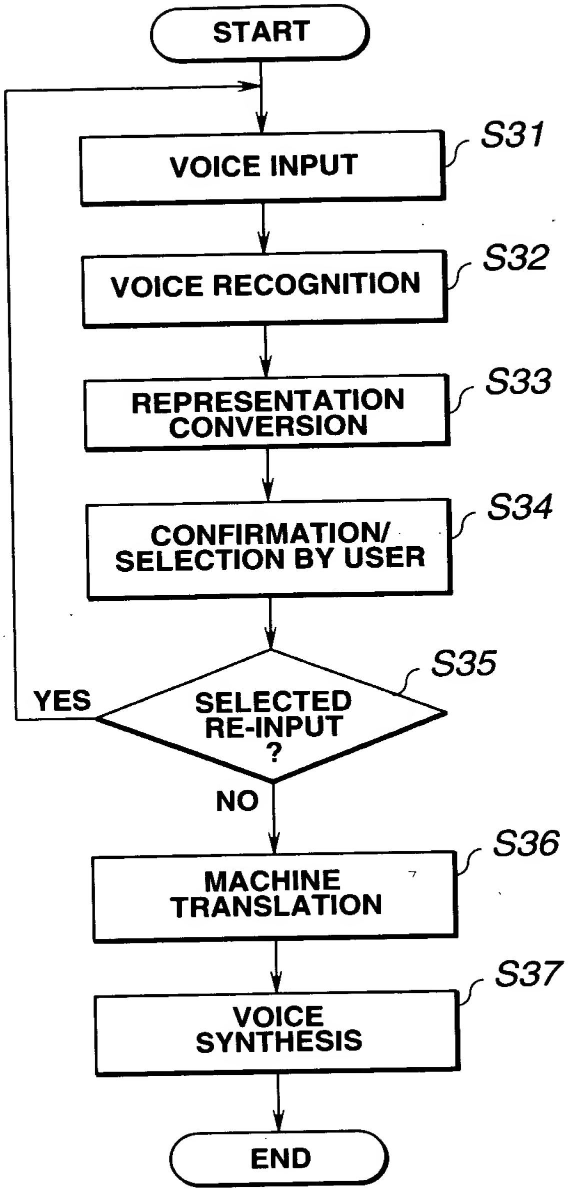
START
VOICE INPUT
S31
VOICE RECOGNITION
S32
REPRESENTATION CONVERSION
S33
CONFIRMATION/ SELECTION BY USER
S34
SELECTED RE-INPUT ?
S35
YES
NO
MACHINE TRANSLATION
S36
VOICE SYNTHESIS
S37
END

FIG.11

09530200 .051500

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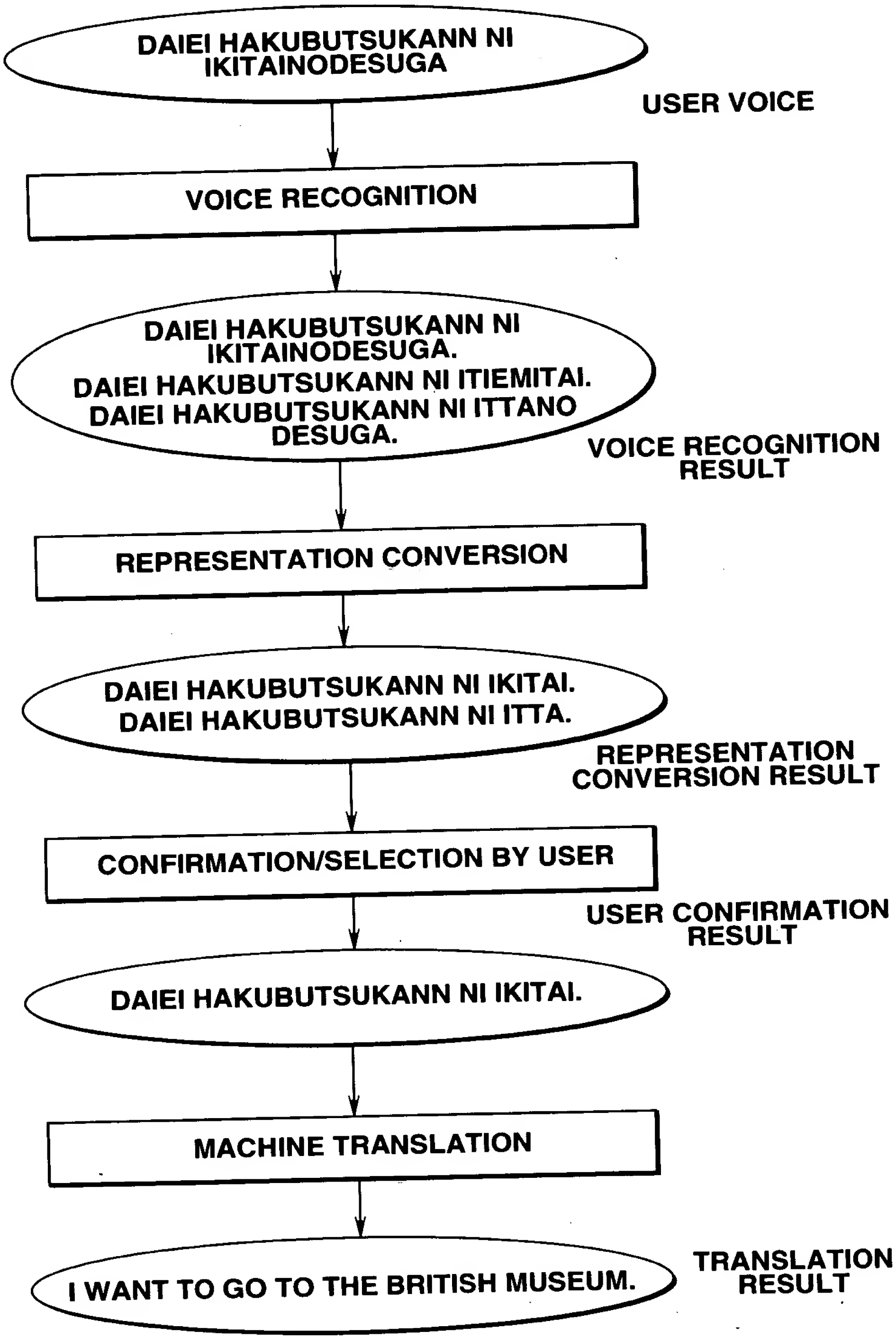
DAIEI HAKUBUTSUKANN NI IKITAINODESUGA
USER VOICE
VOICE RECOGNITION
DAIEI HAKUBUTSUKANN NI IKITAINODESUGA.
DAIEI HAKUBUTSUKANN NI ITIEMITAI.
DAIEI HAKUBUTSUKANN NI ITTANO DESUGA.
VOICE RECOGNITION RESULT
REPRESENTATION CONVERSION
DAIEI HAKUBUTSUKANN NI IKITAI.
DAIEI HAKUBUTSUKANN NI ITTA.
REPRESENTATION CONVERSION RESULT
CONFIRMATION/SELECTION BY USER
USER CONFIRMATION RESULT
DAIEI HAKUBUTSUKANN NI IKITAI.
MACHINE TRANSLATION
I WANT TO GO TO THE BRITISH MUSEUM.
TRANSLATION RESULT

FIG.12

09530200.051500

528 Rec'd

ORIGINAL LANGUAGE	OBJECTIVE LANGUAGE	CHANGE OF EXPRESSION WITHIN ORIGINAL LANGUAGE
[CHANGE OF EXPRESSION FOR POLYSEMOUS WORD]		
1. SUIMASEN	I'M SORRY.	SUIMASEN (=AYAMARU)
2. SUIMASEN	THANK YOU.	SUIMASEN (=ARIGATO)
3. SUIMASEN	EXCUSE ME.	SUIMASEN (=YOBIKAKE)
4. X GA Y O TSUKAU	X USE Y.	(NO CHANGE OF EXPRESSION)
5. X GA Y O TSUKAU	X GO BY Y.	X GA Y DE IKU.
6. X GA Y O TSUKAU	X CONSUME Y.	XGA Y O SHOHI SURU.
[SHORTAGE ELEMENT SUPPLEMENT]		
7. X O TSUKAU	I USE Y.	WATASHI WA X O TSUKAU.
8. X O TSUKAU	I GO BY Y.	WATASHI WA X DE IKU.
9. X O TSUKAU	I CONSUME Y.	WATASHI WA X O SHOHI SURU
10. X O MISETE KUDASAI	PLEASE SHOW ME X.	X O WATASHI NI MISETE KUDASAI
[COMPOUND SENTENCE DEVELOPMENT]		
11. S1 GA, S2	S1, BUT S2.	S1, SHIKASI S2.
12. S1 GA, S2	S1, AND S2.	S1, SOSHITE S2.
13. S1 GA, S2	S1, S2.	S1, S2.

FIG.13

09530200.051500

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INPUT : "KOREO MISETE KUDASAI"
(SAID WITH THE INTENTION THAT "KORE O MISETE AGETE KUDASAI")

↓

OUTPUT :	(RESULT OF CHANGE OF EXPRESSION)	KOREO WATASHI NI MISETE KUDASAI
	(RESULT OF TRANSLATION INTO ENGLISH)	PLEASE SHOE ME THIS.

... BY LOOKING AT "RESULT OF CHANGE OF EXPRESSION", USER UNDERSTANDS THAT TRANSLATION DIFFERENT FROM HIS INTENTION IS CARRIED OUT

FIG.14

INPUT : "TETSU DO O TSUKAI MASU"

↓ SIMPLE SENTENCE END REPRESENTATION CONVERSION

"TETSU DO O TSUKAU"

OUTPUT :

(RESULT 1 OF CHANGE OF EXPRESSION)	WATASHI WA TETSUDO O TSUKAU.
(RESULT 1 OF TRANSLATION INTO ENGLISH)	I USE THE TRAIN.
(RESULT 2 OF CHANGE OF EXPRESSION)	WATASHI WA TETSUDO DE IKU.
(RESULT 2 OF TRANSLATION INTO ENGLISH)	I GO BY TRAIN.
(RESULT 3 OF CHANGE OF EXPRESSION)	WATASHI WA DENSHA O SHOHI SURU.
(RESULT 3 OF TRANSLATION INTO ENGLISH)	I CONSUME THE TRAIN.

....USER CAN SELECT SECOND SENTENCE BY RESULT OF CHANGE OF EXPRESSION AS CLUE

FIG.15

09530200.051500

00STS0"0020ES60

ORIGINAL LANGUAGE	OBJECTIVE LANGUAGE	CHANGE OF EXPRESSION WITHIN ORIGINAL LANGUAGE	COMMENT
[CHANGE OF EXPRESSION FOR POLYSEMOUS WORD]			
1. SUIMASEN	I'M SORRY.		REPRESENTATION AT THE TIME OF APOLOGY
2. SUIMASEN	THANK YOU.		REPRESENTATION OF THANKS
3. SUIMASEN	EXCUSE ME.		REPRESENTATION OF CALLING
4. X GA Y O TSUKAU	X USE Y.		
5. X GA Y O TSUKAU	X GO BY Y.	X GA Y DE IKU.	
6. X GA Y O TSUKAU	X CONSUME Y.	XGA Y O SHOHI SURU.	
[SHORTAGE ELEMENT SUPPLEMENT]			
7. X O TSUKAU	I USE Y.	WATASHI WA X O TSUKAU.	
8. X O TSUKAU	I GO BY Y.	WATASHI WA X DE IKU.	
9. X O TSUKAU	I CONSUME Y.	WATASHI WA X O SHOHI SURU	
10. X O MISETE KUDASAI	PLEASE SHOW ME X.	X O WATASHI NI MISETE KUDASAI	
[COMPOUND SENTENCE DEVELOPMENT]			
11. S1 GA, S2	S1, BUT S2.	S1, SHIKASI S2.	EXPRESSION OF NEGATIVE CONJUNCTION
12. S1 GA, S2	S1, AND S2.	S1, SOSHITE S2.	EXPRESSION OF AFFIRMATIVE CONJUNCTION
13. S1 GA, S2	S1, S2.	S1, S2.	EXPRESSION OF PARALLEL

FIG.16

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INPUT : "SUIMASEN"

1)	(CHANGE OF EXPRESSION)	SUIMASEN
	(COMMENT)	REPRESENTATION AT THE TIME OF APOLOGY
	(TRANSLATION INTO ENGLISH)	I'M SORRY.
2)	(CHANGE OF EXPRESSION)	SUIMASEN
	(COMMENT)	REPRESENTATION OF THANKS
	(TRANSLATION INTO ENGLISH)	THANK YOU.
3)	(CHANGE OF EXPRESSION)	SUIMASEN
	(COMMENT)	REPRESENTATION OF CALLING
	(TRANSLATION INTO ENGLISH)	EXCUSE ME.

FIG.17

09530200.051500

INPUT : "~GA, ~ "

1)	(CHANGE OF EXPRESSION)	~。 SHIKASHI ~。
	(COMMENT)	EXPRESSION OF NEGATIVE CONJUNCTION
	(TRANSLATION INTO ENGLISH)	~, BUT ~.
2)	(CHANGE OF EXPRESSION)	~。 SOSHITE ~。
	(COMMENT)	EXPRESSION OF AFFIRMATIVE CONJUNCTION
	(TRANSLATION INTO ENGLISH)	~, AND ~.
3)	(CHANGE OF EXPRESSION)	~。 ~。
	(COMMENT)	EXPRESSION OF PARALLEL
	(TRANSLATION INTO ENGLISH)	~, ~.

FIG.18

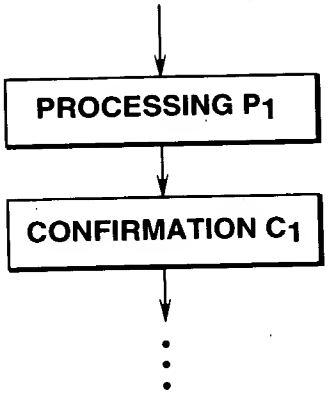
PROCESSING P_1
CONFIRMATION C_1

FIG.19A

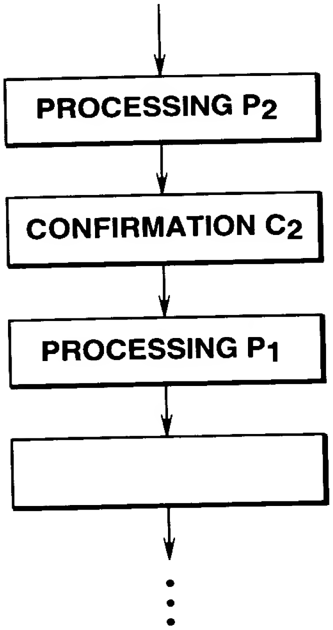
PROCESSING P_2
CONFIRMATION C_2
PROCESSING P_1

FIG.19B

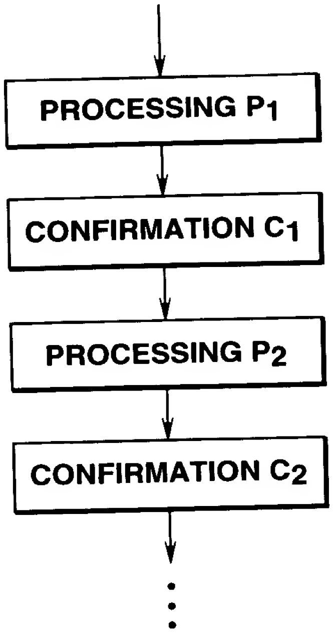
PROCESSING P_1
CONFIRMATION C_1
PROCESSING P_2
CONFIRMATION C_2

FIG.20A

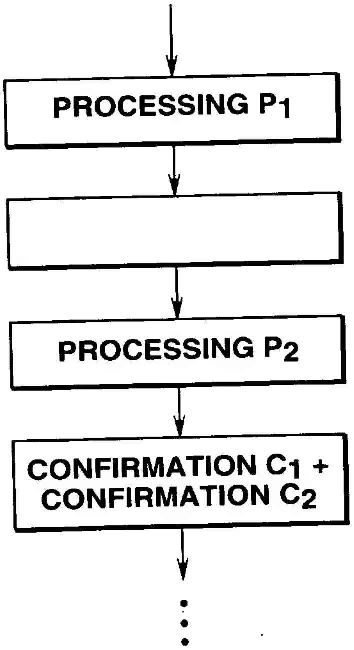
PROCESSING P_1
PROCESSING P_2
CONFIRMATION C_1 +
CONFIRMATION C_2

FIG.20B

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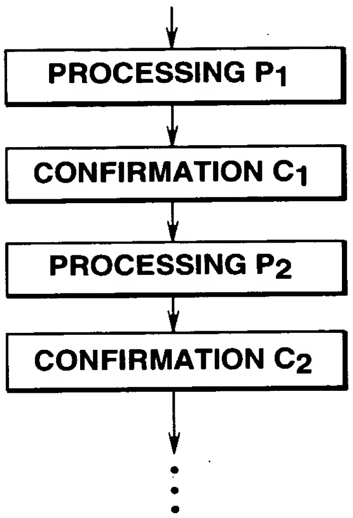
PROCESSING P1
CONFIRMATION C1
PROCESSING P2
CONFIRMATION C2

FIG.21A

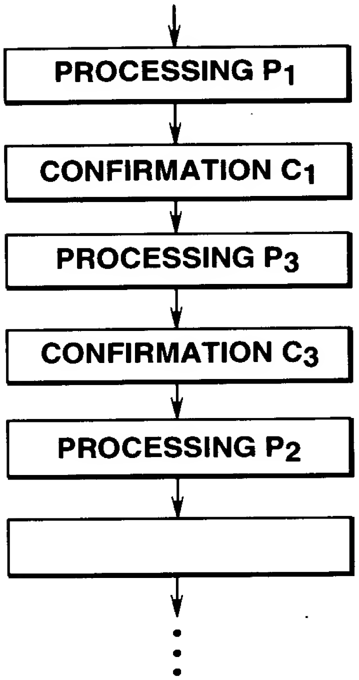
PROCESSING P1
CONFIRMATION C1
PROCESSING P3
CONFIRMATION C3
PROCESSING P2

FIG.21B

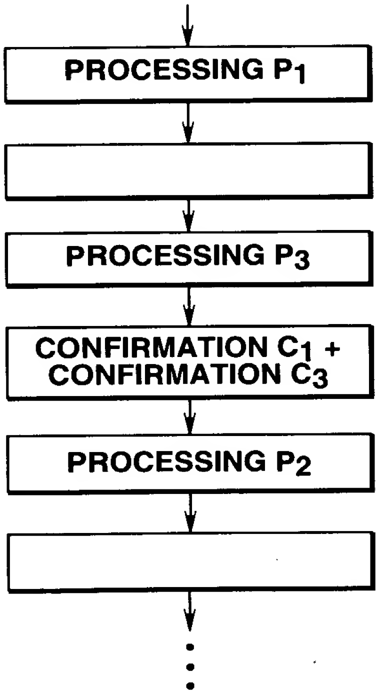
PROCESSING P1
PROCESSING P3
CONFIRMATION C1 +
CONFIRMATION C3
PROCESSING P2

FIG.21C

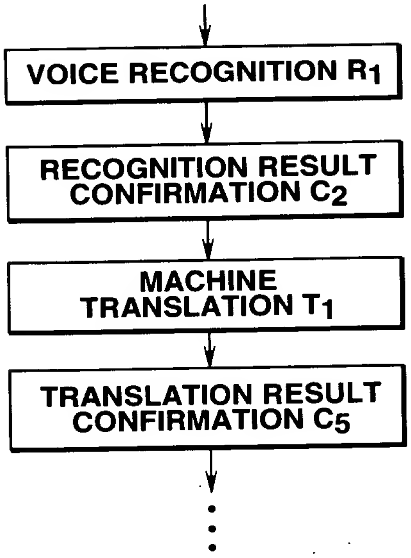
VOICE RECOGNITION R_1
RECOGNITION RESULT CONFIRMATION C_2
MACHINE TRANSLATION T_1
TRANSLATION RESULT CONFIRMATION C_5

FIG.22A

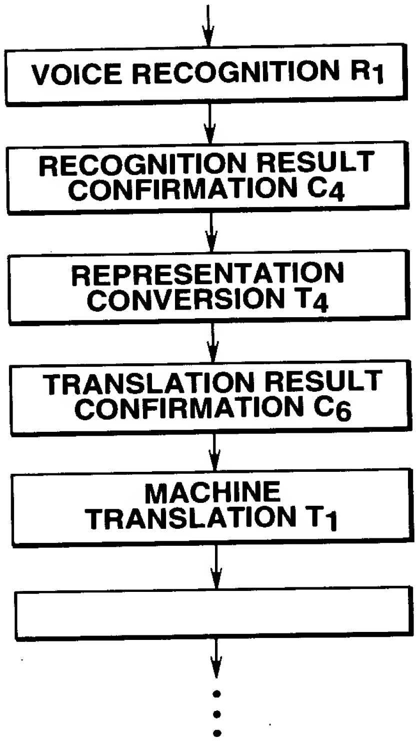
VOICE RECOGNITION R_1
RECOGNITION RESULT CONFIRMATION C_4
REPRESENTATION CONVERSION T_4
TRANSLATION RESULT CONFIRMATION C_6
MACHINE TRANSLATION T_1

FIG.22B

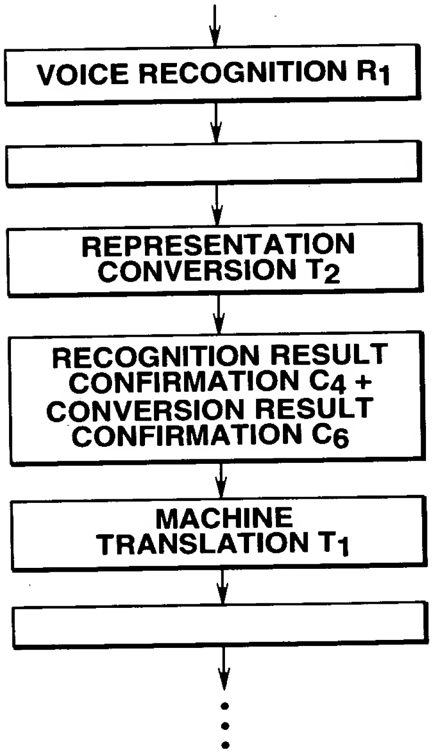
VOICE RECOGNITION R_1
REPRESENTATION CONVERSION T_2
RECOGNITION RESULT CONFIRMATION C_4 + CONVERSION RESULT CONFIRMATION C_6
MACHINE TRANSLATION T_1

FIG.22C

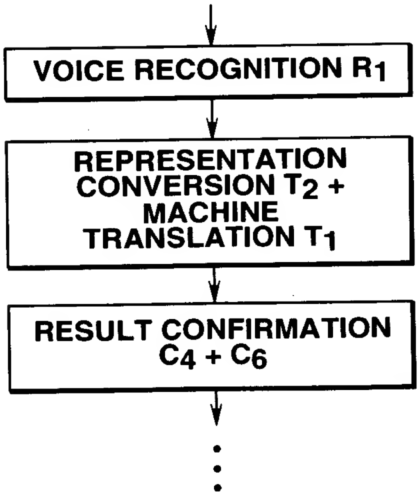
VOICE RECOGNITION R_1
REPRESENTATION CONVERSION T_2 + MACHINE TRANSLATION T_1
RESULT CONFIRMATION C_4 + C_6

FIG.22D

09530200 .051500